

IN THE CLAIMS:

Please cancel claims 2, 5 and 8 without prejudice or disclaimer. Please amend claims 1, 4, 7 and 9-11 as follows. Please add new claims 14-25 as follows. A detailed listing of all claims is as follows.

Claim 1 (Currently Amended): An optical disc recording method comprising the step of having a groove of an optical disc wobble in accordance with a phase modulation signal obtained through phase modulation of serial data including address information to pre-format the optical disc,

said method ~~further comprising the steps~~ a step of generating the phase modulation signal in accordance with said serial data, said phase modulation signal having a substantially constant level in a predetermined period centered at each of phase transition points so that abrupt changes in the waveform thereof at the phase transition points ~~[[being]] are removed in accordance with said serial data,~~ and a step of making said groove wobble in accordance with said phase modulation signal.

Claim 2 (Canceled).

Claim 3 (Original): An optical disc recording method according to claim 1, wherein data of a plurality of basic waveforms constituting said phase modulation signal is stored in a memory, data of one of said plurality of basic waveforms corresponding to the serial data is read from the memory, and the data of said basic waveform having been read is converted to analog data, thereby generating said phase modulation signal.

Claim 4 (Currently Amended): An optical disc recording apparatus for pre-formatting an optical disc by having a groove of the optical disc wobble in accordance with serial data including address information, comprising:

a phase modulation circuit for generating a phase modulation signal in accordance with said serial data, said phase modulation signal having a substantially constant level in a predetermined period centered at each of phase transition points so that abrupt changes in the waveform thereof at the phase transition points ~~[[being]] are removed in accordance with said serial data~~; and

groove wobbling means for making said groove wobble in accordance with said phase modulation signal.

Claim 5 (Canceled).

Claim 6 (Original): An optical disc recording apparatus according to claim 4, wherein said phase modulation circuit comprises a memory for storing data of a plurality of basic waveforms constituting said phase modulation signal, a memory control circuit for reading data of one of said plurality of basic waveforms in accordance with the serial data, and a D/A converter circuit for converting the basic waveform data read from the memory to analog data.

Claim 7 (Currently Amended): An optical disc being pre-formatted with serial data by means of wobbling groove, said serial data including address information, wherein said groove is made wobble in accordance with a phase modulation signal of said serial data, said phase

modulation signal having a substantially constant level in a predetermined period centered at each of phase transition points so that ~~of which~~ abrupt changes in the waveform thereof at the phase transition points are removed.

Claim 8 (Canceled).

Claim 9 (Currently Amended): An optical disc recording method comprising the step of having a wall surface on one side of a groove of an optical disc wobble in accordance with serial data including address information to pre-format the optical disc, wherein:

said serial data includes a synchronization signal having a predetermined pattern for detecting a land and the groove, while said serial data including the synchronization signal is modulated into a phase modulation signal, said phase modulation signal having a substantially constant level in a predetermined period centered at each of phase transition points so that ~~[[with]]~~ abrupt changes in the waveform thereof at the phase transition points ~~[[being]]~~ are removed, and the wall surface on one side of the groove is made wobble in accordance with said phase modulation signal.

Claim 10 (Currently Amended): An optical disc recording apparatus for pre-formatting an optical disc by having a wall surface on one side of a groove of the optical disc wobble in accordance with serial data including address information, said apparatus comprising:

a synthesizer circuit for synthesizing a synchronization signal having a predetermined pattern for discriminating a land and the groove, with said serial data;

a phase modulation circuit for modulating output of said synthesizer circuit into a phase modulation signal, said phase modulation signal having a substantially constant level in a predetermined period centered at each of phase transition points so that ~~[[with]]~~ abrupt changes in the waveform thereof at the phase transition points ~~[[being]]~~ are removed; and

groove wobbling means for making the wall surface on one side of said groove wobble in accordance with said phase modulation signal.

Claim 11 (Currently Amended): An optical disc whereon a wall surface on one side of a groove ~~wobbles~~ wobble in accordance with serial data including address information, wherein:

said serial data includes a synchronization signal having a predetermined pattern for discriminating a land and the groove; and

said groove is made wobble in accordance with phase modulation signal of said serial data including said synchronization signal, said phase modulation signal having a substantially constant level in a predetermined period centered at each of phase transition points so that ~~of which~~ abrupt changes in the waveform thereof at the phase transition points are removed.

Claim 12 (Withdrawn): An optical disc reproduction apparatus for reproducing data from an optical disc, on which a wall surface on one side of a groove wobble formed thereon in accordance with phase modulation signal phase-modulated serial data including a synchronization signal having a predetermined pattern for discriminating a land and a groove and address information, thereby to generate said phase modulation signal with abrupt changes in the waveform thereof at phase transition points being removed, said disc reproduction apparatus comprising:

a phase demodulation circuit for phase-demodulating a groove reproduction signal extracted from a reproduction signal of an optical head; and

a land/groove discrimination circuit for checking pattern of the synchronization signal included in the output of the phase demodulation circuit, and for determining which of the land and the groove is subjected to be reproduced by the optical head.

Claim 13 (Withdrawn): An optical disc reproduction apparatus according to claim 12, further comprising:

a tracking control circuit for applying servo control for tracking of the optical head; and
a polarity inversion circuit for inverting the polarity of a tracking servo signal according to the output of said land/groove discrimination circuit.

Claim 14 (New): An optical disc recording method as claimed in claim 1, wherein said predetermined period is a half of a base period of the phase modulation signal.

Claim 15 (New): An optical disc recording apparatus as claimed in claim 4, wherein said predetermined period is a half of a base period of the phase modulation signal.

Claim 16 (New): An optical disc as claimed in claim 7, wherein said predetermined period is a half of a base period of the phase modulation signal.

Claim 17 (New): An optical disc recording method as claimed in claim 9, wherein said predetermined period is a half of a base period of the phase modulation signal.

Claim 18 (New): An optical disc recording apparatus as claimed in claim 10, wherein said predetermined period is a half of a base period of the phase modulation signal.

Claim 19 (New): An optical disc as claimed in claim 11, wherein said predetermined period is a half of a base period of the phase modulation signal.

Claim 20 (New): An optical disc recording method comprising the step of having a groove of an optical disc wobble in accordance with a phase modulation signal obtained through phase modulation of serial data including address information to pre-format the optical disc, said method further comprising the steps of generating the phase modulation signal in accordance with said serial data, low-pass filtering said phase modulation signal so that abrupt changes in the waveform thereof at phase transition points are removed, and making said groove wobble in accordance with said phase modulation signal.

Claim 21 (New): An optical disc recording apparatus for pre-formatting an optical disc by having a groove of the optical disc wobble in accordance with serial data including address information, comprising:

a phase modulation circuit for generating a phase modulation signal in accordance with said serial data;

a low-pass filter for low-pass filtering said phase modulation signal so that abrupt changes in the waveform thereof at phase transition points are removed; and

groove wobbling means for making said groove wobble in accordance with said phase modulation signal passed through said low-pass filter.

Claim 22 (New): An optical disc being pre-formatted with serial data by means of wobbling groove, said serial data including address information, wherein said groove is made wobble in accordance with a phase modulation signal of said serial data, said phase modulation signal being low-pass filtered so that abrupt changes in the waveform thereof at phase transition points are removed.

Claim 23 (New): An optical disc recording method comprising the step of having a wall surface on one side of a groove of an optical disc wobble in accordance with serial data including address information to pre-format the optical disc, wherein:

said serial data includes a synchronization signal having a predetermined pattern for detecting a land and the groove, while said serial data including the synchronization signal is modulated into a phase modulation signal, said phase modulation signal being low-pass filtered so that abrupt changes in the waveform thereof at phase transition points are removed, and the wall surface on one side of the groove is made wobble in accordance with said phase modulation signal.

Claim 24 (New): An optical disc recording apparatus for pre-formatting an optical disc by having a wall surface on one side of a groove of the optical disc wobble in accordance with serial data including address information, said apparatus comprising:

a synthesizer circuit for synthesizing a synchronization signal having a predetermined pattern for discriminating a land and the groove, with said serial data;

a phase modulation circuit for modulating output of said synthesizer circuit into a phase modulation signal;

a low-pass filter for low-pass filtering said phase modulation signal so that abrupt changes in the waveform thereof at phase transition points are removed; and

groove wobbling means for making the wall surface on one side of said groove wobble in accordance with said phase modulation signal.

Claim 25 (New): An optical disc whereon a wall surface on one side of a groove wobble in accordance with serial data including address information, wherein:

said serial data includes a synchronization signal having a predetermined pattern for discriminating a land and the groove; and

said groove is made wobble in accordance with a phase modulation signal of said serial data including said synchronization signal, said phase modulation signal being low-pass filtered so that abrupt changes in the waveform thereof at phase transition points are removed.